



PRT-RDI2 Intelligent 2 Reader Expander



Installation Manual

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PROTÉGÉ SYSTEM

Introduction

The Protégé System is a powerful integrated alarm and access control management system designed to provide integration with building automation, apartment complex control and HVAC in one flexible package. Communicating through a proprietary high speed protocol across an encrypted RS-485 network using modular-based hardware design, system installers have the flexibility to accommodate any installation from small or large, residential or commercial.

Reader Expander

The PRT-RDI2 Protégé Reader Expander extends the number of card reader inputs on the system by 2, number of zone inputs by 8 (4 zones used for door monitoring and control and up to eight can be used for extended functionality) and the number of PGM outputs by 8 (includes 2 monitored lock control outputs).

Flexible module network architecture allows large numbers of modules to be connected to the RS-485 Module Network. Up to 250 modules can be connected to the Protégé System in any combination to the network up to a distance of 900M (3000ft). Communication beyond this distance requires the use of a RS-485 Network Extender.

Locking a network prevents the removal, substitution or addition of modules to the module network effectively preventing any tampering with the system.

Features

- 4 Wiegand Reader Mode for 2 Entry/Exit Doors Per Reader Expander
- Secure Encrypted RS-485 Module Communications
- 8 Zone Inputs
- 2 Monitored Lock Control PGM Outputs
- 6 Open Collector PGM Outputs (Reader Control Outputs)
- 1.5A Switching Power Supply
- Intelligent Battery Charge and Monitoring
- Smart Reader Missing/Tamper Monitoring
- Online and Remote upgradeable firmware

Reader Expander Specifications



The following specifications are important and vital to the correct operation of the PRT-RDI2 Protégé Reader Expander. Failure to adhere to the specifications will result in any warranty or guarantee that was provided becoming null and void.

Integrated Control Technology continually strives to increase the performance of its products and as a result the specifications may change without notice. It is recommended that you always consult www.integratedcontroltechnology.com for the latest documentation and product information.

Power Supply

AC Input Voltage	16VAC 50/60Hz @ 40VA (Max)
Operating Current	280mA (Typical)
DC Output (Auxiliary)	1.2A (Max)
Battery Charging	350mA/700mA
Battery Low	10.5VDC
Battery Restore	11.5VDC

Communication

RS-485	Isolated Module Network
RS-485	Isolated Slave Network

Outputs

Lock Outputs	2 Outputs 400mA (Max), 500mA Shutdown
PGM Outputs	6 (50mA Max) Open Collector
Status Output	50mA (Max) Open Collector

Inputs

Zone	8 (500ms to 40sec Input Speed)
Tamper	1 (Normally Closed)
Trouble Zone	16

Dimensions

PCB Dimensions	183mm X 234mm 7.2" X 9.2"
Enclosure	330mm X 406mm X 89mm 13" X 16" X 3.5"

Temperature

Operating	5° - 55° Celsius 41° - 131° Fahrenheit
Humidity	0%-85% (Non-Condensing)
Storage	-10° - 85° Celsius 14° - 185° Fahrenheit



It is important that the unit is installed in a dry cool location that is not affected by humidity. Do not locate the unit in air conditioning or a boiler room that can exceed the temperature or humidity specifications.



The isolated communications interface on the Protégé Reader Expander uses full galvanic isolation to prevent ground loop noise and cross phase ground differential. This is a very important feature of the product family and the correct connection of power to this isolated section will ensure the correct operation of the communications network. Failure to apply power to the communication interface will prevent the operation of the communication interface.

Protégé System Management Suite

The Protégé System Management Suite is a Windows 2000/XP Professional Integrated Access Control and Alarm Management system designed for any configuration from single site, single

controller applications up to the global multi-national corporations using multiple site, multiple controller installations.

The Protégé System Management Suite application is ideal for the configuration and management of your Protégé installation. Special built in features and the quick-start kit will get your system up and running in minutes.

Protégé Modules

The Protégé System can be expanded to accommodate large numbers of modules using the encrypted RS-485 network. Modules that are currently available are listed below. Visit the Integrated Control Technology website www.integratedcontroltechnology.com for the latest Protégé module and product information.

Alphanumeric LCD User Interface (PRT-KLCD)

The Protégé LCD User Interface Keypad is the interface between the user and the Protégé System. All programming and end user functions can be performed using the LCD Keypad. The 32 character alphanumeric display uses easy to read messages and menus to guide users through the systems operation. The LCD Keypad also adds two zones (four zones in multiple zone configuration) and one PGM to the Protégé System.

16 Zone Expansion Module (PRT-ZX16)

Extends the Protégé System with the addition of 16 Zones and 4 Programmable Outputs (PGM's). Operates from 16VAC with onboard power supply and isolated communication interface.

16 Zone Standard Expansion Module (PRT-ZXS16)

Extends the Protégé System with the addition of 16 Zones and 1 Programmable Output (PGM). Operates from 12VDC network connection. No onboard power supply.

16 PGM Expansion Module (PRT-PX16)

Extends the Protégé System with the addition of 16 Programmable Outputs (PGM's) (16 7A FORM C Relays). The PRT-PX16 can be connected to the slave communications interface of the PRT-RDI2 2 Reader Expansion Module for FULL monitored elevator control with the addition of the PRT-DRI Destination Reporting Interface Optical Input Module.

16 PGM Standard Expansion Module (PRT-PXS16)

Extends the Protégé System with the addition of 16 Programmable Outputs (PGM's) (16 20mA Open Collector Outputs). Operates from 12VDC network connection. No onboard power supply.

Ethernet Intelligent 2 Reader Expansion Module (PRT-RDE2)

Communicating over a high speed interface using 10/100 Ethernet, interface connection for two card readers, either Wiegand or Magnetic Stripe formats. Four Wiegand Card Readers can be connected in Multiple Card mode. The 2 Reader Ethernet Expansion Module also adds 8 Zones and 8 Outputs to the Protégé System. Some of the outputs on the PRT-RDE2 have specific access control functions and can be used as zones in the Protégé alarm processing functions.

Intelligent 2 Reader Expansion Module (PRT-RDI2)

Adds the interface connection for two card readers, either Wiegand or Magnetic Stripe formats. Four Wiegand Card Readers can be connected in Multiple Card mode. The 2 Reader Expansion Modules also adds 8 Zones and 8 Outputs to the Protégé System. Some of the outputs on the PRT-RDI2 have specific access control functions and can be used as zones in the Protégé alarm processing functions.

Mini 2 Reader Expansion Module (PRT-RDM2)

Adds the interface connection for two card readers, either Wiegand or Magnetic Stripe formats. Four Wiegand Card Readers can be connected in Multiple Card mode. The 2 Reader Expansion Modules also adds 6 Zones and 8 Outputs to the Protégé System. Some of the outputs on the PRT-RDM2 have specific access control functions and can be used as zones in the Protégé alarm processing functions.

Analog 4 Channel Input Expansion Module (PRT-ADC4)

Protégé allows the connection of the latest building automation technology and completely integrated building automation solutions. Adds 4 Analog Inputs (4-20mA or 0-10V) allowing the connection of numerous industrial automation sensors. The Analog Input Expansion Modules also adds 4 PGM Outputs to the Protégé System.

Analog 4 Channel Output Expansion Module (PRT-DAC4)

Protégé allows the connection of the latest building automation technology and completely integrated building automation solutions. Adds 4 Analog Outputs (4-20mA or 0-10V) allowing the connection of numerous industrial automation outputs including air damper and sun louver controls as well as analog flow valves. The Analog Output Expansion Modules also adds 4 PGM Outputs to the Protégé System.

INSTALLATION

Package Contents

When receiving the PRT-RDI2 Protégé Reader Expander you should find the kit contains the items listed below. The kit type is clearly labelled on the packaging and will tell you what your kit contains. Please note that if you do not have the correct contents contact your distributor immediately.

PRT-RDI2-PCB

Contents:

Protégé Reader Expander PCB Only

Reader Expander Printed Circuit Board

6 X Plastic Mounting Standoffs

20 X 1K Ohm Resistors

2 X 1N4007 Lock Reverse EMF Protection Diodes

Red/Black Backup Battery Wires

Location and Mounting

The Protégé Reader Expander is available as a PCB Only (Printed Circuit Board) or complete unit supplied with a metal cabinet. It is recommended that the cabinet provided be used where possible, as this provides the best mounting and installation solution as well as the required cable entry and termination space.

When installing the Protégé Reader Expander ensure that there is adequate clearance around all sides of the enclosure and air flow to the vents of the enclosure are not restricted.

It is recommended to install the Protégé Reader Expander in a location that will facilitate easy access for wiring. It is also recommended that the Protégé Reader Expander is installed in electrical rooms, communication equipment rooms, closets or in an accessible area of the ceiling.

1. Insert the plastic stand-offs in to the locations to mount the PCB board.
2. Calculate the location and position of the enclosure and mark the holes for the keyhole points in the top left and right locations. This will allow you to screw in the screws and then hang the box on them adjusting the location to suit.
3. Ensure a solid fixing point and screw in the two screws. Before tightening the top screws insert the tamper bracket in the slot provided on the right side of the enclosure.
4. Fix the enclosure securely using the remaining mounting holes on the bottom left, right and centre of the enclosure.
5. Insert the PCB in to the enclosure and mount using the plastic standoffs inserted during step one.



Install the enclosure when the circuit board is NOT installed on the plastic stand-offs. This will reduce the risk of damage caused by debris during the installation process.

Cabinet Tamper Switch

The enclosure tamper input signals to the monitoring station or remote computer that the reader expander enclosure has been opened. The tamper input switch should be mounted into the steel bracket provided and connected to the tamper connection terminals as shown in the diagram below. The tamper input opens and closes trouble zone RDxxx:01 on the reader expander.

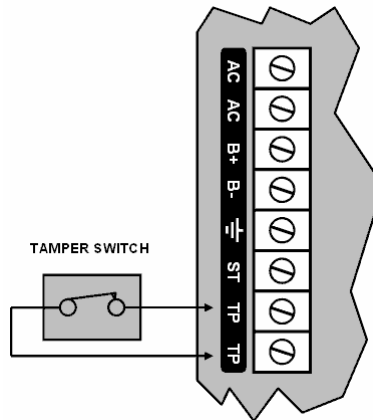


Figure 1 - Tamper Input

Earth Ground Connection

The Protégé Reader Expander has a connection for earth ground. For best results a cold water pipe should be used with a pipe wiring clamp. If a cold water pipe is not available connect to a suitable ground connection in the installation.

A minimum 14AWG solid copper wire should be used from the Protégé Reader Expander's earth connection point to the clamp on the cold water pipe. If other earth clamps are present at the same connection point connect the clamp below the existing units.

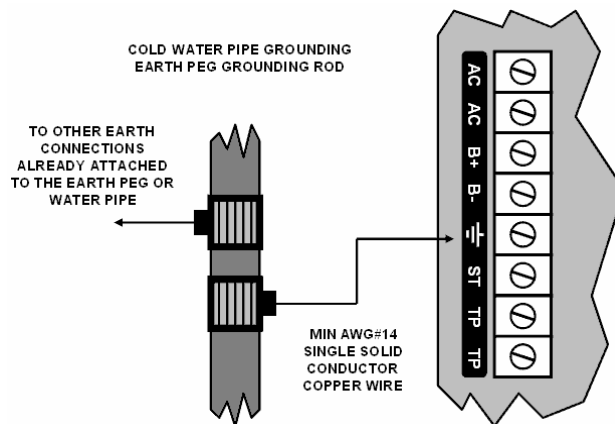


Figure 2 - Reader Expander Main Earth Ground Connections

AC Power

The Protégé Reader Expander should be supplied by a dedicated electrical power source rated for a minimum 10Amp Load and have a dedicated circuit breaker. Do not use a switch controlled breaker or a switched electrical point to supply electrical power. Connect the primary of a 16.5VAC, 50/60Hz, 40VA Transformer to the electrical circuit and run the secondary to the AC input on the controller terminals.

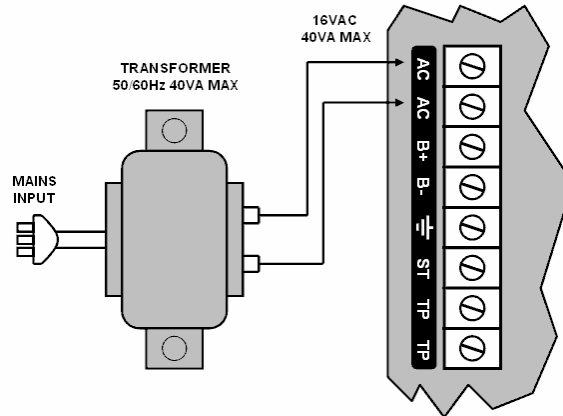


Figure 3 - AC Transformer 16VAC, 50/60Hz, 40VA MAX

Specific regional regulations may allow the transformer to be mounted inside the enclosure. In this case wire the electrical circuit to the electrical termination point inside the enclosure and the secondary wires of the transformer to the AC Input on the controller.



Termination of wiring to the reader expander while power is applied or the battery is connected may cause serious damage to the reader expander and will VOID ALL WARRANTIES OR GUARANTEES. Power the reader expander ONLY after all wiring, configuration and jumper settings are completed and verified.

Backup Battery

It is recommended that a minimum of a 4Ah battery is used as the main backup battery. From the accessory bag provided, connect the RED and BLACK battery termination wires to the B+ and B- terminals. Connect the spade terminals to the battery as shown below. Connection of the battery in reverse will not damage the Reader Expander but will cause the battery fuse (5A Fast Blow) to blow and require replacement.

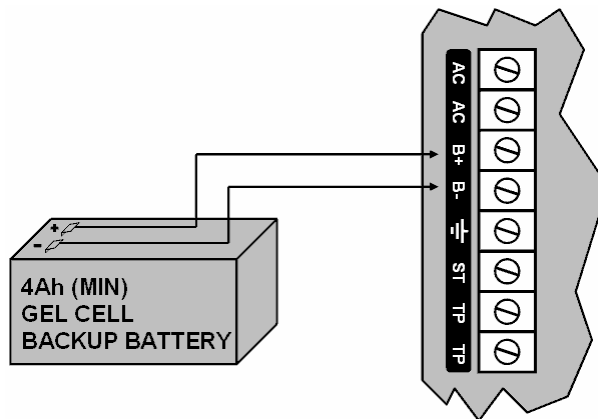


Figure 4 - Battery Connection

The battery test procedure uses a special algorithm to prevent deep discharge and increase battery endurance. A dynamic battery test is performed every ten minutes when AC power is present and a battery condition alarm will be generated if the battery is either disconnected or shows poor capacity. Battery fault conditions will activate the battery trouble zone associated with the address assigned to the reader expander.

If AC is not present the Protégé Reader Expander will monitor the battery for a low voltage level and will activate the battery trouble zone. The next dynamic battery test will occur 30 minutes after AC power has been restored. This delay allows the battery to achieve optimal charging during the first 30 minutes when power is initially restored to the unit. Once the first test is completed the dynamic battery testing will return to 10 minute intervals.

When power is first applied to the Protégé Reader Expander a dynamic battery test will be performed after 30 seconds, this allows the status and condition of the battery to be detected. On completion of this first test the normal testing period of 10 minutes will be resumed.

Status Indicator

The status output will activate according to the status indicator on the Protégé Reader Expander and can be used to provide signalling or indication of the reader expander status outside the enclosure. The following diagrams show the connection of an LED indicator to the status output.

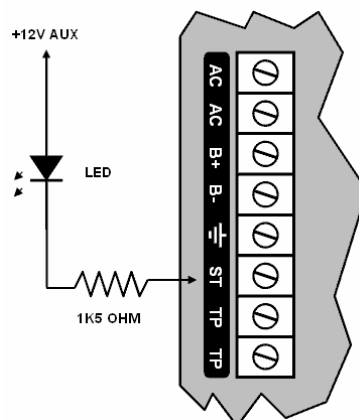


Figure 5 - External Status LED Connection

Encrypted Module Network

The Protégé Reader Expander incorporates encrypted RS-485 communications technology. The isolated communications interface offers full galvanic isolation to prevent ground loop noise and cross phase ground differential between network devices.

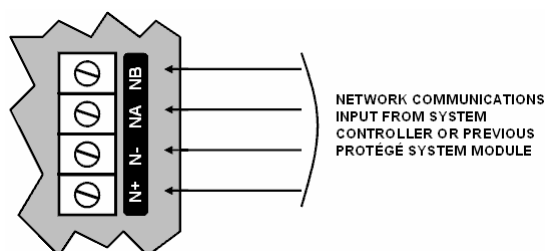


Figure 6 - Standard Communications Connection

Connection of the communications should be performed according to the diagram shown in figure 6. It is important that the N+ Network Communications Power be supplied from an independent battery backed power supply unit or a networked module capable of supplying the required voltage to all devices on the RS485 network.

Always connect the Reader Expanders NA and NB terminals to the NA and NB terminals of the communication network. The N+ and N- must go to a 12V power supply source as shown in the following diagram and connected at ONLY one +12V power source.

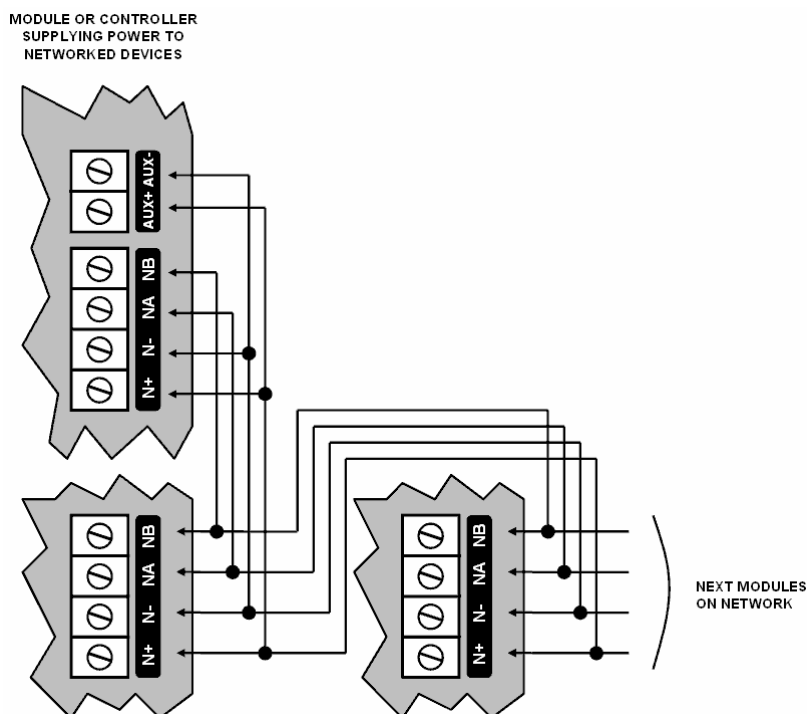


Figure 7 - Network Power Supplied By Network Module

- !** The 12V N+ and N- Communication input must be supplied from only ONE point. Connections from more than one 12V supply may cause failure or damage to the reader expander or device supplying network power.
- ?** The EOL (End Of Line) jumper setting **MUST** be set in the ON position for the **LAST** module on the RS485 network. EOL is ON when the jumper is closest to the EOL text.

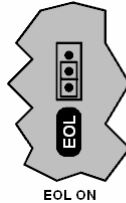


Figure 8 - EOL Jumper ON



Figure 9 - EOL Jumper OFF

Slave Device Network

The Protégé Reader Expander incorporates a secondary encrypted RS-485 communication interface that can be used to expand the functionality of the reader expander for the purpose of High Rise Elevator Control. A floor control module PRT-PX16 Protégé 16 PGM Expander, set as a floor control device, is attached to the slave communication interface.

Connection of the communications should be performed according to the following diagram. It is important that the S+ Slave Communications Power be supplied from an independent battery backed power supply unit or a module connected to the slave communication interface capable of supplying the required voltage to all devices on the slave RS485 network.

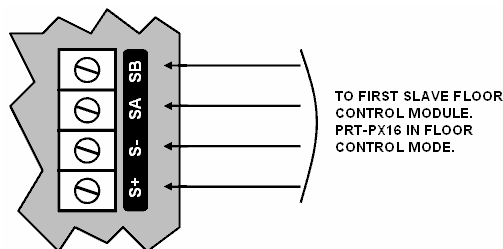


Figure 10 - Slave Communications Connection

Always connect the Reader Expanders SA and SB terminals to the SA and SB terminals of the slave devices. The S+ and S- must go to a 12V power supply source as shown in the following diagram.

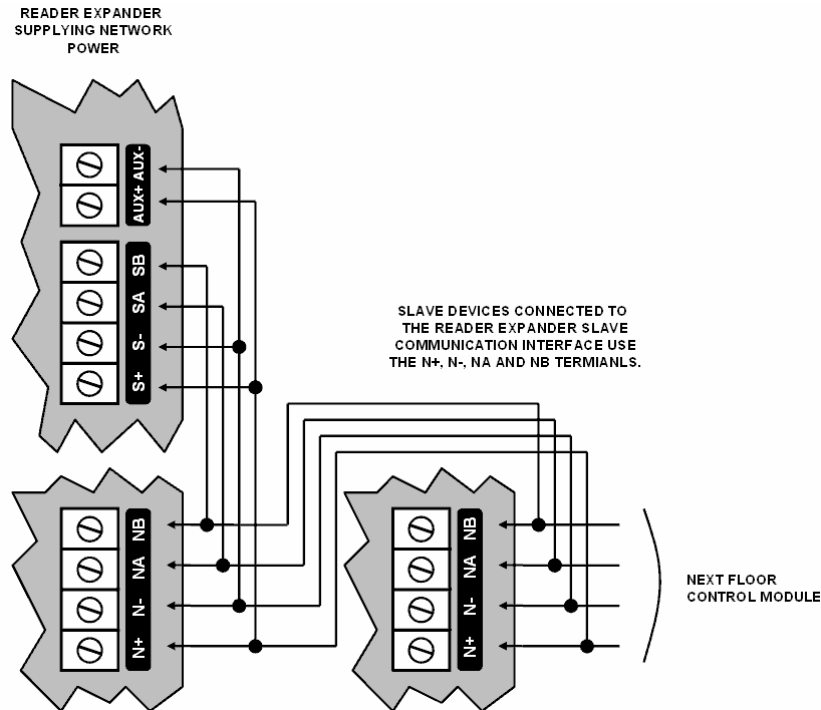


Figure 11 - Slave Power Supplied By Module



The 12V S+ and S- Communication input must be supplied from only ONE point. Connections from more than one 12V supply may cause failure or damage to the reader expander or device supplying slave communication power.



The EOL (End Of Line) jumper setting **MUST** be set in the ON position for the **LAST** slave module on the RS485 network. EOL is ON when the jumper is closest to the EOL text.

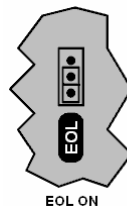


Figure 12 - EOL Jumper ON



Figure 13 - EOL Jumper OFF

RS-485 Biasing Settings

The Protégé Reader Expander has biasing settings for the network and slave communication ports. Biasing can be configured for either high or low (L indicates a low bias and H indicates high bias configuration). Both jumpers **MUST** be set to the same bias type.

When the slave communications is being used to communicate with PRT-PX16 devices in floor control mode or being used to repeat the network communications the biasing **MUST** be set to

low if this is the first RS-485 connection. The other devices must be set to no biasing (Jumper removed or in the middle).



Biassing should only be set to LOW on ONE point on any single segment of the RS-485 network. All other devices on the same segment should be set to the middle position which is no biasing.



The PRT-CTRL System Controller by default has the jumpers for the biasing set to low and the EOL jumper on. This is also the same default configuration for the slave communication port on the Protégé Intelligent Reader Expander.

DOOR ACCESS CONTROL

Introduction

The Protégé Reader Expander allows the control of two separate access controlled doors used for entry or exit only, and a single access controlled door using entry/exit.

Reader Connection

The Protégé Reader Expander allows the connection of 2 reading devices or 4 Wiegand reading devices and the ability to control 2 doors (Entry or Exit Only) or 1 door (Entry and Exit). The following diagrams show the connection of standard Wiegand Reader with the Protégé Reader Expander controlling an Access Door and Entry/Exit Door.

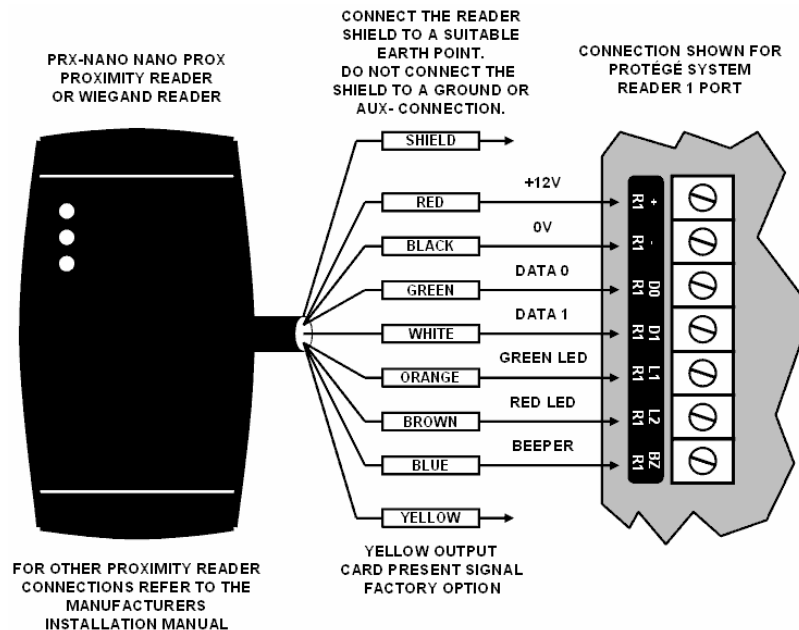


Figure 14 - Standard Reader Interface



The shield connection on the card reading device that is connected to the reader port should NOT be connected to a AUX- or 0V connection. Do not join the shield and black wires at the card reading device. The shield should not be connected to any shield used for isolated communication. Always refer to the card reader manufacturer for detailed installation guidelines.

The beeper output on the PRT-RDI2 provides diagnostic information to the end user and installer when access is denied or the unit is operating offline. Refer to the *PGM Beeper Operation on Page 22*.

Multiple Wiegand Reader Connection

When operating the reader expander in multiple reader mode the Protégé Reader Expander allows the connection of 4 wiegand reading devices controlling two doors each with Entry/Exit readers.

When connecting Wiegand readers in multiple reader mode the secondary reader that is connected will have all connections wired to the same port as the primary card reader with the DATA 1 connection wired to the opposite reader connection DATA 1 input.

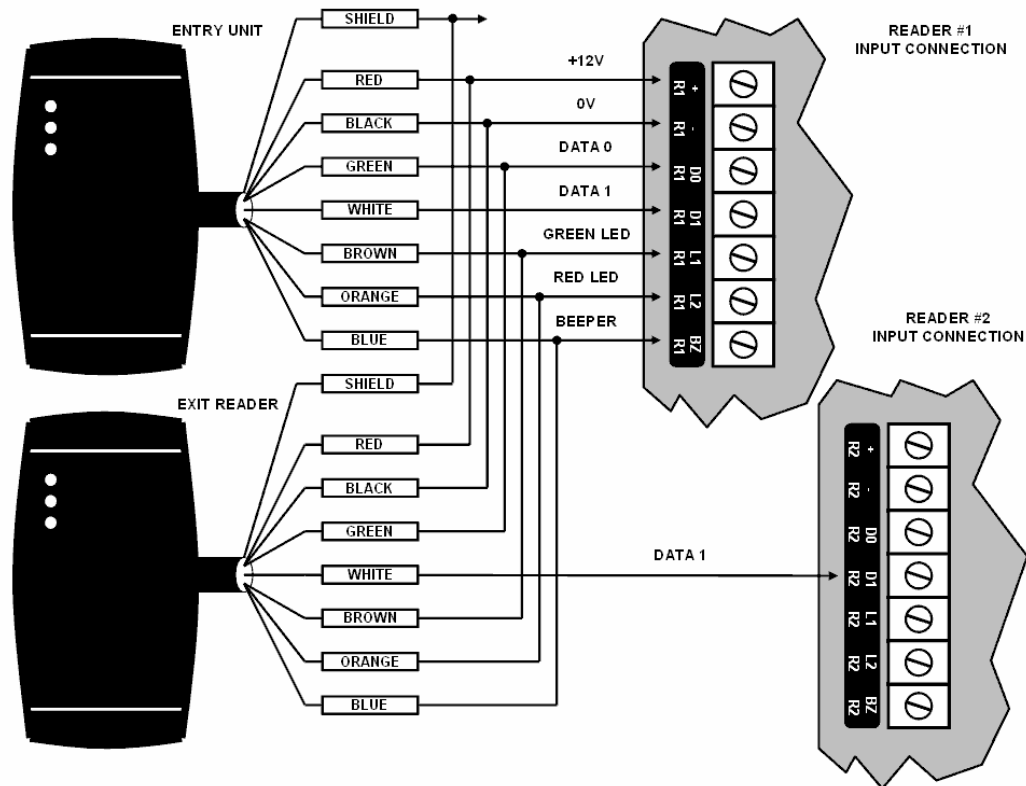


Figure 15 - Multiple Reader Interface



The shield connection on the card reading device that is connected to the reader port should NOT be connected to a AUX- or 0V connection. Do not join the shield and black wires at the card reading device. The shield should not be connected to any shield used for isolated communication. Always refer to the card reader manufacturer for detailed installation guidelines.

The reader that is multiplexed in to the alternate reader port will operate as the exit reader and the normal reader connection should be programmed to operate as the Entry Reader.

Magnetic Reader Connection

The Protégé Intelligent Reader Expander allows the connection of standard magnetic track 2 format cards and provision is made in the software for a large number of formats. Formats include BIN (Bank Identification Number) for ATM access control, Full 16 Character decoding and a range of first 4, 5 and 6 card number encoding.

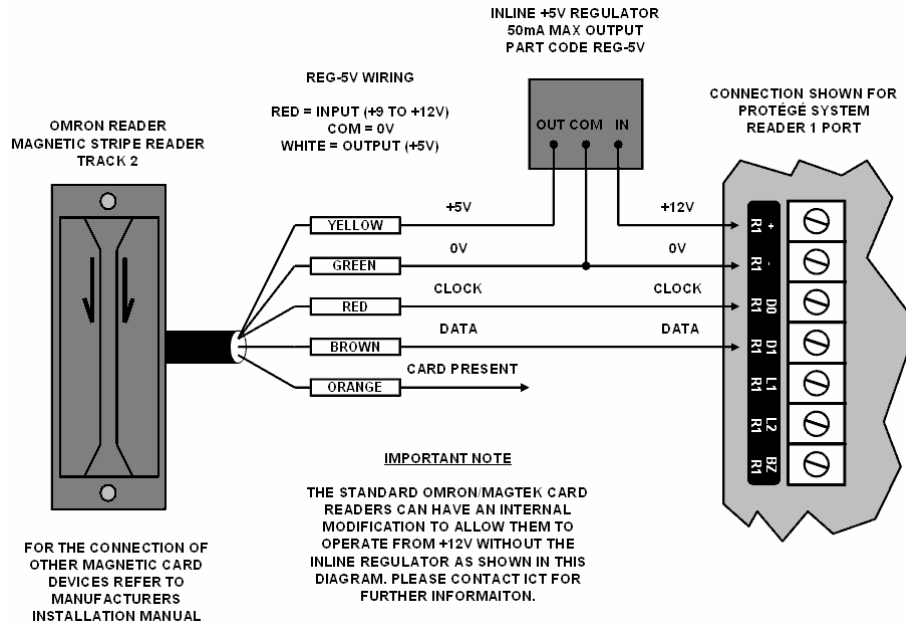


Figure 16 - Magnetic Card Reader Interface



Magnetic Card Readers are typically operated by 5 volts. Before connecting the Magnetic Card Reader to the Intelligent Reader Expander ensure that the supply voltage is correct. If required insert the inline 5V regulator as shown in figure 16.

Door Contact Connection

The Protégé Reader Expander allows the connection of up to 4 contacts for monitoring and controlling access control doors. Each zone on the reader expander can be used for the door function that is automatically assigned and as a normal zone input on the system. The following example shows the connection of a normally closed door position monitoring contact to monitor the open, closed, forced and alarm conditions of the door.

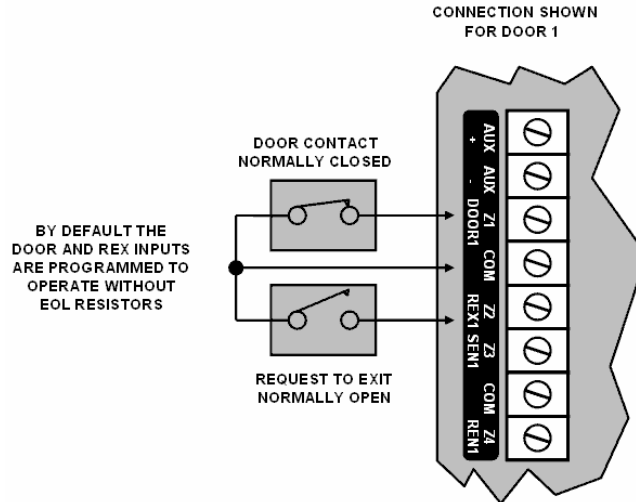


Figure 17 - Standard Door Contact Inputs

! When connected the REX input can be programmed to operate regardless of the Door Contact State. The REX input can also be programmed to recycle the door alarm time to prevent nuisance alarms when the door is held open to permit longer entry.

Door Lock Connection

The Protégé Reader expander provides a connection for 2 electric strike locks with full monitoring of the lock circuit for tamper and over current/fuse blown conditions. The door lock monitoring can be disabled if it is not required. For information on the LOCK control status, refer to the *Indication* section on page 26.

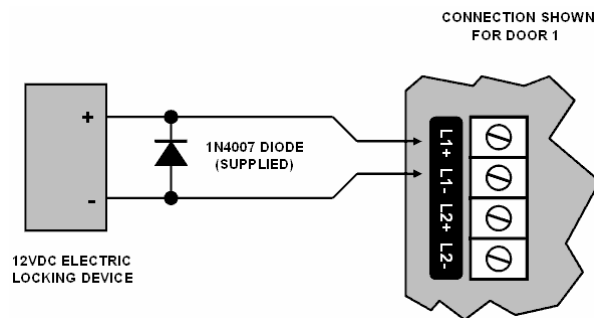


Figure 18 - Door Lock Outputs

? When using a door with an entry and exit reader, the LOCK output should be connected to LOCK 1, and enable the swap lock option for the second reader input to allow the reader LED's to display the correct status.

! The 1N4007 diode shown in Figure 16 is supplied with the Protégé Reader Expander and **MUST** be installed at the electric strike terminals.

ZONE INPUTS

Introduction

The Protégé Reader Expander has 8 Zone Inputs. The reader expander also monitors 16 trouble zones used to report trouble conditions. A trouble zone is in most cases not physically connected with a device, rather it is related within the system. For example a module communication fault causes a trouble zone to open as a result of the communication failure.

Zone Inputs

The Protégé Reader Expander can monitor the state of up to 8 zone inputs such as magnetic contacts, motion detectors and temperature sensors. Devices connected to these zones can be installed to a maximum distance of 300m (1000ft) from the Controller when using 22 AWG. The Controller supports normally opened and normally closed configurations with or without EOL resistors on a per zone configuration setting.

Zones can be programmed from the Protégé LCD Keypad (PRT-KLCD) or using the Protégé System Management Suite (PRT-SMGT). RD001:01 to RD001:08 represent Zone 1 to Zone 8 on the Protégé Reader Expander (Substitute the module address for the appropriate address being programmed).

When using a zone with the EOL resistor configuration, the controller generates an alarm condition when the state of a zone changes and generates a tamper alarm condition when a wire fault (short circuit) or a cut wire (tampered) in the line occurs.

When using the EOL resistor configuration, the EOL resistor option must be turned on for the zone(s) so that the tamper and short states can be monitored (refer to Zones Section in the Protégé Reference Manual).

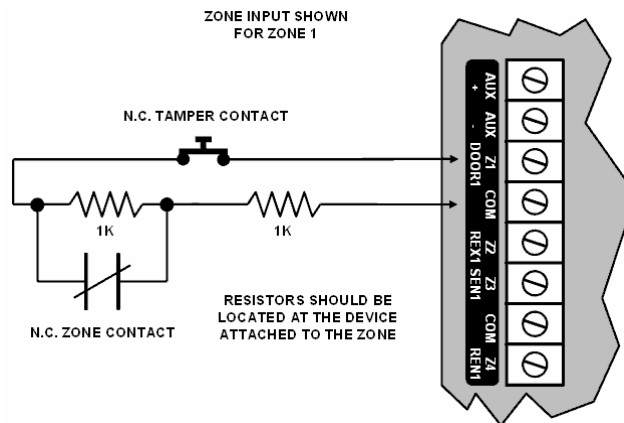


Figure 19 - EOL Resistor Zone Configuration

Each zone input can use a different input configuration. To program a large number of zones, with a single configuration type, use the Multiple Selection feature in the Protégé System Management Suite application.

When using the No Resistor configuration, the Controller only monitors the opened and closed state of the connected input device generating the (OPEN) Alarm and (CLOSED) Sealed conditions.

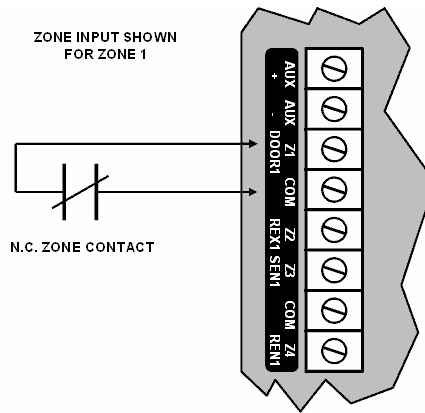


Figure 20 - Normally Closed Zone Configuration No Resistors

Trouble Zone Inputs

Each reader expander can monitor up to 16 trouble zones. Trouble zones are used to monitor the status of the reader expander and in most cases are not physically connected to an external zone. For example, trouble zone RD001:06 is used to monitor door 1 for a forced open condition and will generate an alarm state if the door is forced.

The following table details the trouble zones that are configured in the system and the trouble type and group that they activate.

Zone Number	Description	Type	Group
RDxxx:01	Module Tamper	System Tamper	System
RDxxx:02	AC failure	Power Fault	General
RDxxx:03	Low Battery	Power Fault	General
RDxxx:04	Aux Failure	Power Fault	General
RDxxx:05	Lock Failure	Power Fault	General
RDxxx:06	Door 1 Forced	Forced Door	Access
RDxxx:07	Door 2 Forced	Forced Door	Access
RDxxx:08	Door 1 Left Open	Left Open	Access
RDxxx:09	Door 2 Left Open	Left Open	Access
RDxxx:10	Reader 1 Voltage	Power Fault	General
RDxxx:11	Reader 2 Voltage	Power Fault	General
RDxxx:12	Reader 1 Tamper	System Tamper	System
RDxxx:13	Reader 2 Tamper	System Tamper	System
RDxxx:14	Door 1 Lockout	Attempts	Access
RDxxx:15	Door 2 Lockout	Attempts	Access
RDxxx:16	Module Offline	Module Offline	System

Replace the 'xxx' with the appropriate address of the reader expander that you are programming.

PROGRAMMABLE OUTPUTS

Introduction

The Protégé Reader Expander has 4 Programmable Outputs (PGM's). The PGM's are used to activate the Electric Door Locks, Sirens, Lighting Control and Relay Accessory Products.

Lock PGM Outputs (1 and 2)

The + and - terminals of Lock1 (PGM1 RD001:01) and Lock2 (PGM2 RD001:02) are used to power electric door strikes and other lock control devices that require a steady voltage output. The lock outputs supply 12Vdc upon an unlock or activation and support up to 1A inrush and 400mA continuous operation. The lock output uses an electronically fused circuit and automatically shuts down if the current exceeds 1A.

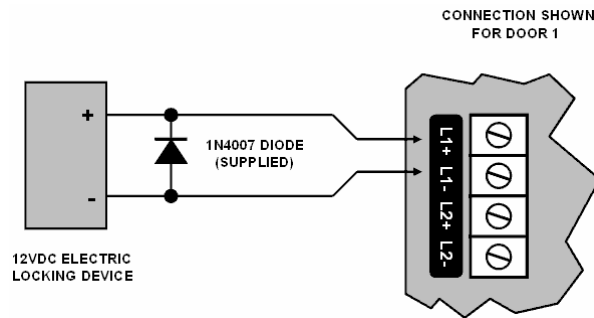


Figure 21- Lock Output PGM1/2 Connection (PGM 1 Shown)

If the load on the lock terminals returns to normal ($\leq 1A$), the reader expander will reinstate power to the lock terminals if they are activated.

When the lock output is not used, the appropriate trouble zone will be activated (refer to the Trouble Zone Input section on Page 20). To avoid this, connect a 1k Ω resistor across the lock output. If the Lock is not being used for another function, and the trouble zone is not programmed in the system, no resistor is required.

Standard PGM Outputs (3 To 8)

The PGM outputs 3, 4, 5, 6, 7 and 8 on the Protégé Reader Expander are open collector outputs and switch to a ground connection.

The PGM's have a default pre-programmed function as detailed in the following table and are used to control the indicator and audible outputs on the attached reading device. These functions may be disabled by programming the appropriate setting in the reader expander configuration.

PGM Number	Description
RDxxx:03	LED 1 (Green) Reader 1

	also be generated if the door group is not set or the door group schedule is not valid.
1 Long Beep 3 Short Beeps	Access Denied Area Group. The user is denied access because they do not have access to the area that is being controlled by the door. If the area that the door is associated with is armed, and the user does not have this area in their area disarm group, they will be denied access. This also depends on the area group settings for the door.
1 Long Beep 4 Short Beeps	Access Denied Access Level. The user is denied access because they do not have a valid access level or the access level they are assigned is currently outside the programmed schedule.

CONFIGURATION SWITCH

Introduction

The addressing of the Protégé Reader Expander allows up to 128 devices to be connected to the Protégé System Controller. The 'CONFIG' configuration DIP switch allows each reader expander to have a unique address.

Address Configuration

The switch positions 1 to 7 select the device address from 1 to 128. When setting an address the reader expander must be powered down (Battery and AC) and restarted for the new address to take affect. When changing the address the reader expander will automatically default the internal configuration and require a network update. See the Protégé System reference manual for information on performing a module update.

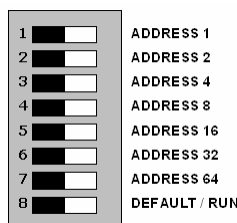


Figure 23- Reader Expander CONFIG Switch Functions

The device address is determined by adding the value of each switch that is selected in the ON position and then adding 1 to this value. In the example below the address 079 results in $(64+8+4+2) + 1 = 079$. Setting all address switches to OFF results in the default address of 001.

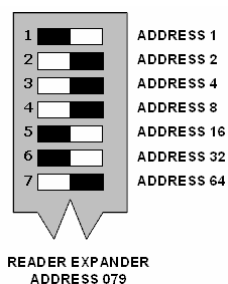


Figure 24- Reader Expander Configured For Address 079

STATUS INDICATION

Introduction

The Protégé Reader Expander includes extensive diagnostic indicators that can aid the installer in diagnostic faults and conditions. In some cases an indicator may have multiple meanings depending on the status indicator display at the time.

Status Indicator

The Status Indicator is located in the centre of the PCB and indicates the status of the Protégé reader expander. If the Protégé Reader Expander is operating normally the LED will indicate this by **FLASHING** at 1 second intervals. **FLASHING** rapidly at 250ms intervals indicates that the reader expander is attempting to register with the system controller, or that communication has failed and the reader expander is retrying the request.



When the fault indicator is **ON** the status indicator will show an error code. Refer to the section *Error Code Display* on page 28 for more information.

Fault Indicator

The fault indicator LED is identified by the text 'FAULT' and is located in the centre of the PCB. When the fault indicator is **FLASHING** the Reader Expander is operating in firmware update mode, or there is no firmware loaded. The fault indicator when **ON** indicates that an error has occurred while trying to register with the system controller. The status indicator will flash a number of times indicating an error code. Refer to the section *Error Code Display* on page 28 for more information.

Charge/Test Indicator

The charge and test indicator serves two functions; it will indicate that a Battery Test is in progress and that Battery Charging is being performed. When AC is present the battery charging current will be indicated by a varying **INTENSITY** level on this indicator. This indicator will be **ON** when a battery test is in progress by illuminating brightly for 30 seconds every 10 minutes.

This indicator is identified by the text 'CHARGE/TEST'. This indicator does not function when no AC is present. For more information refer to the *Battery Backup* section on page 9.

Auxiliary OK Indicator

Auxiliary voltage is supplied to the AUX+ outputs through the auxiliary fuse. If auxiliary supply is normal the 'AUX OK' indicator will be **ON**. If the auxiliary fuse is damaged the 'AUX OK' indicator will be **OFF**.

AC OK Indicator

When a valid AC input is provided to the Protégé System Controller the 'AC OK' indicator will be **ON**. When the AC is disconnected or has failed the 'AC OK' indicator is **OFF**.

5V Isolated Power Indicator

The reader expander communicates using an isolated RS-485 interface for optimal performance and this requires an isolated supply on the N+ and N- or the S+ and S- terminals. When a valid power supply is input the '5V ISO' indicator will be **ON** for the interface. The '5V ISO' indication is shown on the slave and network isolated interfaces.

Lock 1/Lock 2 Indicators

The Lock 1 and Lock 2 indicators will show the status of the Lock Output and the over current or circuit fault conditions.

ON	Lock is ON .
TWO FLASHES	Lock is ON , the circuit is in Over Current Protection or the fuse has blown.
THREE FLASHES	Lock is OFF , the circuit to the locking device is cut, damaged or tampered.

Network RX/TX Indicator

The Network Receive and Transmit Data indicators are located on the top right side of the PCB beside the network communication interface. The indicator shows when the Protégé Reader Expander is transmitting and receiving information from the module communications interface and is identified by the text 'RX' and 'TX'. When the indicator is **ON** data is being transmitted or received.

Slave RX/TX Indicator

The Slave Receive and Transmit Data indicators are located on the right side of the PCB beside the slave communication interface. The indicator shows when the Protégé Reader Expander is transmitting and receiving information from the slave communications interface and is identified by the text 'RX' and 'TX'. When the indicator is **ON** data is being transmitted or received.

R1 and R2 Power Indicator

The R1 and R2 power indicators are located beside the reader 1 and reader 2 connection terminals. Reader voltage is supplied to the R+ outputs through the reader fuse. If the reader supply is normal the indicator will be **ON**. If the indicator is **OFF** the reader fuse is damaged.

R1 and R2 Data Indicator

The R1 and R2 data indicators are located beside the reader 1 and reader 2 connection terminals. A short **FLASH** (<250 Milliseconds) on the Data Indicator will show that data was received but was not in the correct format. A long **FLASH** (>1 Second) indicates that the unit has read the data and the format was correct.

ERROR CODE INDICATION

Introduction

When the reader expander attempts to register or communicate with the system controller a registration error can be generated indicating that it was not successful.

Error Code Display

The following table is only valid if the FAULT indicator is **ON** and the STATUS indicator is **FLASHING**. If the fault indicator is **FLASHING** the Reader Expander requires a firmware update or is currently in firmware update mode.

The status indicator will **FLASH** with the error code number. The error code number is shown with a 250ms **ON** and **OFF** period (duty cycle) with a delay of 1.5 seconds between each display cycle.

FLASH	ERROR DESCRIPTION
1	Unknown Error Code <i>The error code returned by the system controller could not be understood by the reader expander. Contact Integrated Control Technology..</i>
2	Firmware Version <i>The firmware version on the reader expander is not compatible with the system controller. To clear this error, update the module using the module update application.</i>
3	Address Too High <i>The reader expander address is above the maximum number of reader expanders available on the system controller. To clear this error change the address to one within the range set on the system controller, restart the reader expander by disconnecting the power.</i>
4	Address In Use <i>The Address is already in use by another reader expander. To clear this error set the address to one that is currently not occupied by a reader expander. Use the view network status command to list the attached devices, or the network update command to refresh the registered device list.</i>
5	Controller Secured Registration Not Allowed <i>Controller is not accepting any module registrations. To allow module registrations use the network secure command to change the secure setting to not secured.</i>
6	Serial Number Fault <i>The serial number in the device is not valid. Return the unit to the distributor for replacement.</i>
7	Locked Device <i>The reader expander or system controller is a locked device and can not communicate on the network. Return the unit to the distributor for replacement.</i>

ORDERING INFORMATION

Product Codes

Please use the following product codes when placing an order for the Protégé Reader Expander.

PRT-RDI2-PCB	Protégé Reader Expander (PCB Only)
<i>Includes</i>	<i>Accessory Bag</i>

To order the Protégé Intelligent Reader Expander in a cabinet order the CAB-LRG large steel cabinet complete with transformer and tamper connections.

Manuals and literature are available at the Integrated Control Technology website in the documentation section. If you require manuals on CD-ROM please request a literature CD-ROM from the website.

WARRANTY

Introduction

The Protégé Reader Expander is covered under the Integrated Control Technology standard terms and warranty agreement. This document can be downloaded from the Integrated Control Technology web site or obtained by return fax.

Contact

Integrated Control Technology welcomes all feedback. Please visit our website or use the information below.

Integrated Control Technology

P.O. Box 302-340
North Harbour Post Centre
Auckland
New Zealand

Unit C,
6 Ascension Place
Mairangi Bay
Auckland
New Zealand

Phone: +64-9-476-7124

Fax: +64-9-476-7128

www.integratedcontroltechnology.com

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Unit C, 6 Ascension Place, Mairangi Bay, P.O. Box 302-340
North Harbour, Auckland, New Zealand.
Phone: +64 (9) 476 7124 • Fax: +64 (9) 476 7128
www.integratedcontroltechnology.com